

What is claimed is:

1. An uninterruptible power supply comprising:

a precharge circuit including:

5 a first precharge contact;

a capacitor having first and second leads, the first lead electrically coupled to the first contact;

a second precharge contact electrically coupled to the second lead of the capacitor;

10 a current limiting circuit having first and second leads, the first lead of the current limiting circuit electrically coupled to the first lead of the capacitor; and

a third precharge contact electrically coupled to the second lead of the current limiting circuit; and

a battery pack sensor electrically coupled to the precharge circuit, the sensor operative to

15 sense the presence of an extra battery pack.

2. The UPS of claim 1 wherein the UPS further comprises:

a battery cartridge having a battery with positive and negative terminals, a first cartridge

contact coupled to the positive terminal of the battery and adapted for mating with the first

20 precharge contact, a second cartridge contact coupled to the negative terminal of the battery and adapted for mating with the second precharge contact, and a third cartridge

contact electrically coupled to the first cartridge contact, the third cartridge contact adapted

for mating with the third precharge contact, at least one of the first cartridge contact and

the first precharge contact being recessed relative to the third cartridge contact and the

25 third precharge contact, respectively, such that the capacitor is precharged through the third

cartridge contact prior to full electrical contact between the first cartridge contact and the

first precharge contact.

3. The UPS of claim 1 wherein the battery pack sensor comprises:

30 a first sensor contact electrically coupled to the first precharge contact;

a second sensor contact electrically coupled to the second precharge contact;

a third sensor contact; and

a sensing circuit electrically coupled to the third sensor contact and to the first sensor contact.

4. The UPS of claim 3 wherein the sensing circuit comprises:

a microprocessor having first and second pins, the microprocessor operative to sense the

5 presence of a battery pack;

a first resistor having first and second leads, the first lead electrically coupled to the first
sensor contact and the second lead electrically coupled to the first microprocessor pin;

a second resistor having first and second leads, the first lead electrically coupled to the first
microprocessor pin and the second lead electrically coupled to the second sensor contact;

10 a third resistor having first and second leads, the first lead electrically coupled to a voltage
source and the second lead electrically coupled to the first microprocessor pin;

a diode having an input lead and an output lead, the input lead electrically coupled to the first
microprocessor pin; and

15 a fourth resistor having first and second leads, the first lead electrically coupled to the output
lead of the diode and the second lead electrically coupled to the third sensor contact.

5. The UPS of claim 4 wherein the sensing circuit further comprises a switch and wherein the
first resistor is electrically coupled to the first sensor contact via the switch.

20 6. The UPS of claim 3 wherein the UPS further comprises:

a battery pack including a battery having a positive terminal and a negative terminal, a first

pack contact electrically coupled to the battery positive terminal and adapted for mating

with the first sensor contact, a second pack contact electrically coupled to the battery

negative terminal and adapted for mating with the second sensor contact, a sense pack

25 contact electrically coupled to the second pack contact and adapted for mating with the
third sensor contact of the sensor.

7. The UPS of claim 6 wherein the battery pack further comprises a resistor and the sense pack
contact is electrically coupled to the second pack contact via the resistor.

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8. The UPS of claim 1 wherein the UPS further comprises an enclosure including
a housing; and
a battery connector integral to the housing, the battery connector adapted to house the
first, second and third precharge contacts.

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9. The UPS of claim 6 wherein the battery pack further comprises an additional pack connector
having a first additional pack contact electrically coupled to the first pack contact, a second
additional pack contact electrically coupled to the second pack contact, and sense additional pack
contact electrically coupled to the sense pack contact.

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10. The UPS of claim 2 wherein the UPS further comprises
a mechanism associated with at least one of the first, second, and third precharge contacts
and operative to slow completion of an electrical connection between the cartridge contacts and
the precharge contacts to allow adequate time for precharging the capacitor.

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11. The UPS of claim 10 wherein the mechanism is a protrusion at a first contact point between
a precharge circuit contact and a battery cartridge contact.

12. The UPS of claim 2 wherein the battery cartridge further comprises

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a male connector; and

a mechanism coupled to the male connector and operative to slow completion of an
electrical connection between the cartridge contacts and the precharge contacts to allow adequate
time for precharging the capacitor.

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13. The UPS of claim 12 wherein the male connector comprises first, second, and third prongs
operative to house the first, second, and third cartridge contacts, respectively, and

wherein at least one of the prongs comprises a depressible tongue extending out from the
side of the prong at an angle, the tongue including an extension operative to ensure that the
insertion of the male connector into the female connector pauses once the precharge contact is

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made but prior to when the first contact is made.

14. An uninterruptible power supply (UPS) comprising:

precharge means including:

a first precharge contact; and

a charge storage element having first and second leads, the first lead electrically coupled

5 to the first precharge contact;

the precharge means for precharging the charge storage element prior to full electrical

contact between a battery cartridge and the first precharge contact; and

battery pack sensor means electrically coupled to the precharge circuit, the sensor means for
sensing the presence of an extra battery pack.

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15. The UPS of claim 14 wherein the battery pack sensor means comprises:

a first sensor contact electrically coupled to the first precharge contact;

a second sensor contact electrically coupled to the second precharge contact;

a third sensor contact; and

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a sensing circuit electrically coupled to the third sensor contact and to the first sensor contact.

16. The UPS of claim 15 wherein the sensing circuit comprises:

a microprocessor having first and second pins, the microprocessor operative to sense the
presence of a battery pack;

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a first resistor having first and second leads, the first lead electrically coupled to the first
sensor contact and the second lead electrically coupled to the first microprocessor pin;

a second resistor having first and second leads, the first lead electrically coupled to the first
microprocessor pin and the second lead electrically coupled to the second sensor contact;

a third resistor having first and second leads, the first lead electrically coupled to a voltage
source and the second lead electrically coupled to the first microprocessor pin;

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a diode having an input lead and an output lead, the input lead electrically coupled to the first
microprocessor pin; and

a fourth resistor having first and second leads, the first lead electrically coupled to the output
lead of the diode and the second lead electrically coupled to the third sensor contact.

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17. The UPS of claim 16 wherein the sensing circuit further comprises a switch and wherein the first resistor is electrically coupled to the first sensor contact via the switch.

18. An enclosure for a UPS, the enclosure comprising:

- 5 a housing;
- a utility outlet integral to the housing;
- a power cord integration element integral to the housing; and
- a battery connector integral to the housing.

10 19. The enclosure of claim 18 wherein the enclosure further comprises:

- a battery box compartment; and
- wherein the battery connector is integral to the battery box compartment.

20. The enclosure of 19 wherein the battery box compartment forms a cavity adapted to receive

15 a battery.

21. The enclosure of 19 wherein the enclosure further comprises a battery box compartment door operative to enclose the battery box compartment.

20 22. The enclosure of claim 18 wherein the battery connector is a female connector.

23. The enclosure of claim 22 wherein the battery connector is adapted to receive a three-pronged male connector attached to a battery pack.

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